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NPIC/TSSG/RED/SRB-020-70
16 March 1970

MEMORANDUM FOR THE RECORD

SUBJECT: Laser Projection Feasibility Study

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1. On Monday and Tuesday, November 23 and 24, 1969, respectively, the Project Officer visited [redacted] for the purpose of observing the Air Force acceptance test of a rear projection breadboard system utilizing a laser as a light source. This system was constructed for the Rome Air Development Center for a contract price of approximately [redacted]. The contract stipulated that the resolution obtained by using coherent light (laser source) should exceed that obtained when using the conventional (tungsten) light source, optics and screen (Polacoat LS 60G), currently used in the Variscan Rear Projection Viewer. Preliminary results indicate that this goal was achieved. Results of the verifying tests by Air Force personnel will be forthcoming from the Rome Air Development Center in the near future. In addition, the Project Officer has arranged for receipt of one (1) copy of the final project report from the Rome Air Development Center.

2. The breadboard system observed during this visit incorporated an Argon Ion Laser which had been modified slightly so that additional output could be obtained. This laser emitted a 4880 Angstrom (blue line) and a 5145 Angstrom (green line). A commercially available Ealing resolution target (1,000 line pairs/mm, high contrast, 15 bar) was used to determine the Modulation Transfer Function (MTF). Further resolution tests at various density levels will be conducted by the Rome Air Development Center. Subjective evaluations of the output of this breadboard system by the Project Officer resulted in noting a distinct improvement in resolution when viewed with coherent light versus incoherent light.

3. It would appear that there is a definite advantage in using coherent light in a rear projection viewer. Certain advantages accrue from its use without any apparent serious disadvantages. The brightness is adequate (230 ft. candles on the back of the rear projection screen) but somewhat less than that of the tungsten source normally used in the Variscan Rear Projection Viewer. An external cooling source (either open or closed circuit) is required for the laser. However, there is diminished heating of the film due to the almost complete lack of heat inducing frequencies at the film gate. Dust and minor imperfections in the optics

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have little apparent effect on the final projected image. The blue-green light emitted by the Argon Ion Laser is a possible drawback, mainly due to its subjective unacceptability by the Photographic Interpreters, although, this color light is most compatible with the human eye when considering high resolution capability.



Project Officer
Systems Research Branch, RED/TSSG

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Distribution:

Orig - RED Rt & File (50031)
1 - RED/SRB Chrono

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